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# PROBLEM ANALYSIS RESEARCH IN FOREST RECREATION

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Forest Service  
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# PROBLEM ANALYSIS RESEARCH IN FOREST RECREATION

By S. T. Dana<sup>1</sup>

## SCOPE OF REPORT

This analysis is a result of a recommendation by the Department of Agriculture's Forest Research Advisory Committee that the Department place more stress on research in the field of forest recreation. It is based on interviews with a large number of representatives of Federal, State, and private agencies, on a review of much of the literature on the subject, and on a limited amount of field work in the West and the Northeast. The study has covered forest lands as a whole for two reasons: (1) The management of the recreational resources of the national forests, as of their other resources, can be considered intelligently only in relation to the management of similar resources in other ownerships, both public and private; and (2) the Forest Service has comprehensive responsibilities for research relating to all forest resources.

A major purpose of research is to provide the information needed for sound decisions in the fields of policy making, management, and administration. Suggestions for research consequently deal with problems in these fields. Their solution will often require cooperation between and within different agencies, including participation by administrative as well as research organizations.

Webster's New International Dictionary defines recreation as "refreshment of the strength and spirits after toil; diversion; play; also a mode or means of getting diversion or refreshment." Webster's Dictionary of Synonyms adds: "Recreate and the far more common recreation usually imply a change of occupation or an indulgence in diversion for the sake of relaxation or refreshment of body or mind." Recreation is, therefore, both a leisure-time activity and a result of that activity; it is both a means and an end. In the hope of avoiding confusion, the spellings "recreation" and "re-creation" will be used in quotation marks in this report to refer respectively to the activity and to the result of the activity whenever the meaning of the term may be in doubt.

"Recreation" may cover a wide range of experiences from playing pool to camping in a wilderness. It involves "outgo" on the part of the recreationist in the form of expenditures for goods and services which can usually be expressed in monetary terms. What happens to the recreationist as a result of the activity is "income" in the form of changes in his physical, mental, moral, or spiritual condition which cannot usually be expressed satisfactorily in monetary terms. Both "recreation" and "re-creation" have economic and social impacts of major significance to the community as well as to the individual recreationist. As will be brought out more specifically later, research is urgently needed to identify and evaluate the personal, social, and economic impacts of different kinds of "recreation" and "re-creation."

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## INCREASING NEED FOR RESEARCH

Recreational use of forest and related lands has been developing rapidly. For example, the number of visits to national parks, monuments, and recreation areas (including the Theodore Roosevelt National Memorial Park) increased from less than 2,000,000 in 1924 to 29,314,000 visits in 1954, with a total of 43,834,000 visits to the entire National Park system (exclusively of the National Capital Park system). In national forests the number of visits during the same period increased from 4,660,000 to 40,304,000. Visits to State parks reached all-time highs of more than 166 million in 1954 and more than 183 million in 1955.

The Curtis Publishing Company estimates that during the year ending March 31, 1953, 48.0 percent of the families in the United States, representing 20,160,000 families and 82,253,000 individuals, took vacation trips of three days or more, in the course of which they spent nearly \$8 billion. A report recently issued by the Fish and Wildlife Service shows that in 1955, 11,784,000 hunters and 20,813,000 fishermen spent nearly \$3 billion in pursuit of their sport.

So far as national forests are concerned, recreation has risen steadily from a minor to a major use. This is particularly true of areas developed for picnicking and camping and of lands withdrawn from commercial use such as wild and wilderness areas. The changing position of recreation was clearly recognized in 1932 in the following instructions issued by the Chief of the Forest Service to Regional Foresters:

The importance of recreational use as a social force and influence must be recognized and its requirements must be met. Its potentialities as a service to the American people, as the basis for industry and commerce, as the foundation of the future economic life of many communities, are definite and beyond question. Its rank in national-forest activities will in large degree be a major one and in a limited degree a superior one. It will in many situations constitute a use of natural resources coordinate and occasionally paramount to their industrial conversion into commercial commodities, and as a recognized form of use of natural resources it deserves and should receive the same relative degree of technical attention and administrative planning that is now given to the other forms of utilization.

In addition to this declaration of policy by the Chief of the Forest Service, Congress has recognized recreation as a desirable use of national forests both by substantive legislation and by appropriations for its administration. In this connection, it is worth remembering that recreational use of the national forests brings the Forest Service into direct contact with many more people than all other uses combined. This fact emphasizes the opportunity to render an important service to large numbers of people, whose judgment of the efficiency of the Forest Service as a multiple-use, land-management agency will depend largely on the effectiveness of that service.

That research can be more helpful than has so far been the case in making the best use of our wildland recreational resources, on both public and private lands, is clear. Certainly policy makers, managers, and administrators would benefit as much from having accurate and adequate information at their disposal in this field as they do in the handling of other resources. The following suggestions indicate some of the problems on which research is needed. In many cases they are of such a nature as to require cooperative effort.

## SUPPLY AND DEMAND

Of basic importance is determination of the present and potential supply of and demand for recreational resources and facilities. "Supply" and "demand" are here used in the popular rather than the technical sense, since some, at least, of the "intangible" values of recreation which so frequently influence public policy are not susceptible of measurement by the price mechanism of the market place. There is no established market for wilderness areas or campgrounds for use for recreational purposes, and the number of these established by public agencies is not likely to be determined by the financial gain or loss anticipated to result from their administration.

At the same time economic considerations cannot be entirely disregarded. Private owners will naturally not make their lands available for recreational use unless they expect to receive an adequate return from such use either in cash or good will. Public policy will also be influenced to some extent by the cost of providing recreational services and by prospective monetary and non-monetary returns. And public use of recreational services will be governed in large part by the charge made for such use (its "price"), whether or not that charge is fixed arbitrarily or by the market. These matters will be discussed further in later sections of the report.

## A Recreational Inventory and Continuing Survey

Since 1930 the Forest Service has been studying the supply of and demand for the timber resources of the country. This study has taken the form of a continuing "Forest Survey" and of periodic "reappraisals" or "timber resource reviews." Similar approaches might well be used in studying recreational resources, the use of which must be considered in connection with the use of other natural resources as part of the broad picture of wildland management. Two projects seem to be in order: (1) An inventory of the present and prospective situation with respect to the opportunities for recreational activities of various kinds, and (2) a continuing survey to supplement and keep up to date the initial inventory. The latter is comparable in some, but not all, respects to the Scenic Resources Review proposed by the Sierra Club. A continuing study of the situation is essential because most forest lands have a potential value for recreational use of some sort, which must be reviewed and analyzed from time to time in the light of changing conditions, preferences, and pressures.

An adequate supply-and-demand study of recreational resources will be a difficult and expensive task that will require much careful preliminary planning. Both the planning and the conduct of the study should be a cooperative enterprise in which many agencies--Federal, State, county, and private--should participate. It is impossible in this report to go beyond suggesting some of the main items relating to objectives and methodology that should receive consideration.

## Present and Potential Supplies

On the supply side, a first step is to assemble a list of existing recreational areas and facilities. Much, perhaps most, of the needed information is already available in the files and plans of the agencies concerned, but it needs to be brought together and to be put into comparable form. Decision must be reached with respect to such matters as terminology, classification, description, and identification of recreational areas, and as to the detail with which facilities will be reported. The objective should be to get as clear a picture as possible of the number, character, location, capacity, equipment, and condition of areas now used for recreational purposes of various kinds on both public and private lands. Such information is indispensable for any intelligent estimate as to what modification and expansion of areas already developed is necessary to meet both present and prospective demands.

The next step is to locate and list the areas potentially available for various kinds of recreational use under current concepts of the characteristics needed to make them suitable for these uses. For the sake of comparability the same standards should be used in inventorying both present and potential recreational resources, and also in the continuing recreational survey. Identification of the quality of particular areas for different recreational uses (such as picnicking, fishing, hunting, camping, hiking, skiing, waysides, summer homes, resorts, and pioneering under wilderness conditions) is important, as is also the possibility of improving the quality class, as for example by grading, removing rocks, planting trees or shrubs, stream improvement, etc. The number of top-quality recreation areas is limited, and as time goes on it will become increasingly necessary to use areas of lower quality, of course laid out and developed as attractively as possible. The history of "weed" trees is likely to be repeated in the recreation field, and it would be rash to prophesy that there are areas which will never be of value for recreation purposes, even in the desert. It is also possible to create some types of recreational areas, such as ponds and lakes, and this possibility should not be overlooked.

It is equally true that demands on other natural resources are increasing. Demand is likely to develop for timber now regarded as of too poor quality or too inaccessible to be merchantable; in arid regions every last drop of water may become valuable for municipal or irrigation use. Historic sites and objects may be endangered by reservoir construction and other uses. A growing population and an expanding economy will increase the relative scarcity of all natural resources and will inevitably intensify competition for their use for different purposes. Any inventory of potential recreational resources should, therefore, indicate also their potential value for other uses in order to permit

an informed judgment as to which use has the higher priority. No one use, no matter how important, can be considered in a vacuum.

Methodology. Timber inventories have always been made by the sampling process. Whether a similar methodology can be used with recreational resources is unknown. Inventories of existing areas and facilities have usually been made by actual count, but a personal inspection and description of every potential area would be an almost impossible task. Perhaps there is already enough general knowledge of the location and character of areas of high and medium quality to make such further field examination of them as is necessary a relatively simple task. Areas of lower quality might then be left for future consideration, or enough knowledge of them for present purposes might be obtained by sampling. In any event, the methodology of making useful inventories of areas of potential value for recreational use deserves careful study. The difficulties of the task should not be underestimated.

During the latter part of the nineteen thirties the Forest Service made a rather comprehensive nationwide survey of sites of potential value for recreational purposes on the national forests. Conditions have changed so materially since that time that an effort is now being made to bring the survey up to date. This work should be speeded up, intensified, and coordinated. The information is needed for immediate use in connection with the administration of the national forests, and with some modifications could undoubtedly be fitted into any national inventory that may be undertaken. Other agencies such as the National Park Service, several States, and some counties are conducting similar surveys. Consultation among all of these agencies to bring about as much uniformity of objectives and methodology as is feasible would be desirable and should not be delayed until a more comprehensive project can be initiated.

So far as the Forest Service is concerned, the bulk of the field work will be done by the regular administrative field force. Participation by the forest experiment stations would, however, be helpful in formulating appropriate methodologies and analyzing the information obtained. Recognizing the survey as a specific project to which personnel is assigned as necessary would increase its effectiveness. Experience in the Timber Resource Review indicates procedures that would promote cooperation between the experiment stations, regional offices, and national forests.

It might also be desirable to precede the national survey by a pilot study in a single State or region. Such a trial run would disclose the strong and weak points in the procedures adopted and would permit going forward on a broader scale with greater confidence.

## Present and Potential Demands

On the demand side, as on the supply side, a first step is to determine the present use of existing facilities. Here again much information is already available, but it is by no means complete and in many cases its accuracy is open to question. This is particularly true with respect to the use of individual campgrounds, picnic areas, and wild and wilderness areas. It would be

helpful if the various agencies could agree on the basic information desired and on methods of obtaining it which would make the figures reasonably comparable. The National Park Service has gone farther than any other agency in obtaining detailed information concerning visitors to the areas under its jurisdiction, and other agencies would do well to take advantage of its experience. It is probable, however, that even here there is room for improvements in methodology.

This is a field in which the statisticians in the research organization of the Forest Service, as well as statisticians in other fields and agencies, could make a real contribution by developing methods for collecting whatever information is desired concerning the current use of recreational areas (number of visitors, purpose of visit, season of visit, length of stay, State of origin, means of travel, expenditures, etc.) with reasonable accuracy and at a reasonable cost. Methods meeting these specifications are urgently needed for use on national forests and would be helpful to other agencies.

Some knowledge of potential demand is also essential for intelligent planning. It can be predicted by studying past and present trends, by analyzing the many factors that influence the demand, and by questionnaires or personal interviews with prospective users. Among the factors that have already increased the recreational use of forest lands, and are likely to do so still more in the future, are greater population, mounting national income, larger disposable personal income, shorter work weeks and work days, longer vacations, changing habits in recreation, improved transportation facilities (including particularly better roads and more express highways), earlier retirement and longer life, concentration of population in urban centers, and the need to find relief from the pressures and tensions of modern life. It seems inevitable that these factors, all of which are working in the same direction, will create a demand far exceeding expectations of even a few years ago; but analysis of the probable influence of each factor is necessary to predict their combined influence as accurately as possible.

Facilities desired. For practical purposes it is necessary to know not only what the total pressure is likely to be but where it will be exerted and for what kinds of facilities. How many people should a particular county, State, national forest, or national park expect to have to provide for? What proportion of these will want to use picnic grounds, tent sites, trailer sites, wilderness areas? How many of the campers cannot be happy without flush toilets and laundry tubs, and how many prefer more primitive facilities? Do most people like a crowded campground, if so how crowded, or do they prefer more privacy?

Questions like these, which are also discussed later in connection with the subject of values, must be answered to determine what the customer wants, whether it is decided to give it to him or not. Probably the best way to get the answers is to ask the users. This can be done either while they are actually engaged in a recreational activity or at home--or at both places. The interviewing can be conducted, or the questionnaire distributed, by a representative of the appropriate recreational agency, or by a company or institution that specializes in public opinion surveys. Each method has its advantages

and disadvantages. In either case it is essential that the sampling methods used and the questions asked be worked out beforehand with the greatest care.

In estimating potential demands it is important to use the same classifications and standards as those used in estimating potential supplies. Otherwise it will be impossible to compare the two in formulating future programs of development. It is also important to get some idea of the probable effect that charges at different levels would have on the prospective user's patronage of different kinds of recreational areas and facilities. Would he be willing to pay \$0.50, \$1.00, or \$1.50 a day for the use of a camp site equipped only with primitive facilities; and how much more would he pay if flush toilets, hot and cold showers, and laundry tubs were provided? Information of this sort is needed both in deciding on a policy with respect to charges and in estimating the probable effect on the demand in case a charge is made.

Objection may be raised to opinion surveys, which will also be discussed later in another connection, on the ground that the administrator knows better than "the man on the street" what forms of recreational use, what facilities, and what charges (if any) will best serve the public interest and even the interest of the user himself. This viewpoint is of doubtful validity. Even in cases where it may be sound, the administrator is more apt to make a wise decision if he is fully informed as to public opinion; and if he is convinced that the public is wrong, he had better start an educational program to convert it to his way of thinking if he wishes his decision to stick. Knowledge of public opinion is also of value to groups with specialized interests such as hunters, fishermen, and wilderness advocates in advancing the programs which they support.

As in the case of supply, a national study of demand might well be preceded by pilot studies in one or more States or regions. The locality chosen should be the same as that selected for the supply study. Whatever the choice, the situation is complicated by the fact that the demand comes not only from the State or region where the supply is located but from other parts of the country. This out-of-State demand constitutes an important part of the picture and must receive adequate consideration.

### **Relation of Research to Planning**

Information on present and potential supply and demand in the entire field of recreational use of wildlands is indispensable for sound planning by the various agencies (public and private) with responsibilities in that field, and for developing the comprehensive "plan for coordinated and adequate public park, parkway and recreation-area facilities for the people of the United States" which the National Park Service is authorized to prepare under the Act of June 23, 1936.

Planning cannot proceed intelligently without full knowledge of the objectives sought and of the resources available to attain those objectives. Furthermore, "to be of value, planning must be a continuing process," as the Park Service points out in "Mission 66." There must, therefore, be a continuing stream of knowledge to enable planning to keep abreast of changing

conditions. The continuing recreational survey previously suggested (similar to the Forest Survey) offers the most effective way of making such knowledge available to all concerned.

## COSTS, RETURNS, AND VALUES

No aspect of the recreational use of wildlands has caused more discussion--and more confusion--than the determination of values. The confusion arises partly because of failure to distinguish between the value of the basic resource (the land itself) and the values accruing to the individual recreationist and to the community from the use of that resource. It stems also from the difficulty, if not impossibility, of expressing the economic, personal, and social costs and returns associated with "recreation" and "re-creation" in strictly comparable terms. The latter difficulty is particularly serious in attempting to compare the relative value of recreational use with other land uses, and of different forms of recreational use.

### Land Values

Theoretically the value of a piece of land for any specific use can be determined by capitalizing the net money income derivable from that use. Thus, an owner can estimate the probable receipts from operation of a campground; subtract the estimated cost of operation, including allowances for maintenance and depreciation; and capitalize the difference at whatever rate of interest he regards as appropriate. He can then compare this value with the value of the same piece of land for timber production or any other purpose for which it may be suited. Market values, for various reasons, may vary considerably at any given time from this calculated value, but in the long run will tend to approximate it.

In practice so few wildlands in private ownership, outside of summer home sites and resort areas, have been devoted solely to recreational use as a profit-making enterprise that few calculations of this sort have ever been made, and well-established market values do not exist. Many private owners, both small and large, permit hunting and fishing on their lands (so far as practicable under restrictions to prevent damage) as a public service and sometimes for the incidental income obtainable by charging for the privilege. Recently some of the larger owners have been developing camp sites for public use, usually without charge. Here the returns accrue primarily in the form of good will, but also in the provision of greater control of the recreational use of private lands, public demand for which is increasing as population grows and facilities on public lands become more and more overcrowded. A study that might well be undertaken by private owners, both independently and as part of the national inventory previously suggested, would be to locate the areas suitable for recreational use by the public, and to estimate the opportunity cost and cash cost of developing and operating them. They could then decide whether this cost is justified by anticipated returns in the form of good will and cash (which may run from zero up depending on whether a charge is to be made).

Private owners have so far shown little interest in promoting the recreational use of forest and other wildlands as a business enterprise. This is presumably because of doubt as to whether such use would pay in comparison with other uses, particularly in view of the large areas of public land available for public use either free or at a nominal charge. Government agencies in turn have gone ahead with their recreational programs because private owners were not doing so and because of doubt as to whether the "intangible" personal and social values sought could be obtained under private development. Whether the situation has now changed sufficiently so that Federal, State, and local governments should encourage greater private activity by reducing government activity in this field, or by increasing charges, is open to question but certainly deserves consideration.

The answer depends on the cost and quality of service that private enterprise can be expected to provide. In the words of the Federal Interagency Committee on Recreation, "Recreation is a human need which is essential at all times to the well-being of the people, and the national welfare is promoted by providing opportunities for wholesome and adequate recreation." In effect, governments have felt that "recreation" and the resulting "re-creation" constitute a social good in a class with education and health which must be made generally available without much regard for the relation between costs and direct financial returns. Net income has, therefore, received negligible consideration and little attention has been paid to evaluation for recreational use of the basic resource--the land. Because of all these facts, no definite market has developed for wildlands to be used primarily for recreational purposes.

### **"Impact" Values**

As a result, far more effort has been devoted to determining the values accruing to the individual and to society from the recreational use of wildland than to determining its effect on land values. Values of the former sort might be termed "impact" values. They include returns to the individual in the form of heightened pleasure, physical and mental health, esthetic appreciation, and spiritual uplift, and returns to society in the form of better citizens, greater productivity, and a general strengthening of the economy. Comparisons with other activities, and decisions as to the amounts that can wisely be spent for the promotion of recreation, are ordinarily based on such criteria as these. Research aimed at appraising the significance of the various criteria that may be used, and at determining the best methodology for measuring them, is consequently of prime importance.

### **Expenditures Method of Measurement**

"Tangible" returns that can be measured in dollars and cents have so far attracted much more study than the "intangible" returns that are difficult to express in any unit of measurement, although it is universally admitted that they may be of equal or even greater value than the tangible returns. The most common method has been to estimate the expenditures for recreational purposes, both nationally and locally, on the assumption that these expenditures serve the dual purpose of measuring the minimum value of the

recreational experience to those making them, and of measuring the impact of the recreational use on the national or local economy. Simple as the method looks, it involves difficulties both of methodology and interpretation.

Just what expenditures for transportation, food, lodging, supplies, and equipment should be included; how should they be divided geographically when a person travels from Maine to California with numerous stops for recreational purposes en route; how should they be divided functionally when the trip combines business and pleasure? What methodology of sampling will give the most accurate figures at reasonable cost for the purpose in view?

Interpretation of expenditures as an indication of the minimum value of the recreational experience to the spender raises even more troublesome questions. Probably it is preferable to the method formerly suggested more often than today of assuming that a visit to a picnic area or a campground must be worth at least as much to the user as the cost of attending a moving picture show (or, for those with higher sights, a symphony concert). But does either method give any real measure of the satisfaction obtained by the recreationist or of the improvement in his physical, mental, and spiritual well-being, which are the real values at stake?

Similar difficulties arise when we attempt to compare recreational values with other values, such for example as timber values. At what point do we measure the timber value--on the stump, at the log deck, on the green chain, in the retail lumber yard, or in the form of furniture? Is there any esthetic value that should be credited to the timber because people may prefer wooden furniture to metal furniture? What economic valuation can be placed on timber as an integral part of a wilderness area and as an integral part of a sustained-yield timber management unit?

## Influence on Local Economy

The expenditure method has much greater utility in measuring the impact of recreation on the economy of local communities, States, regions, and the Nation. Expenditures by recreationists stimulate business in the industries whose goods and services they buy. These industries prosper, and governments benefit from the real and personal property taxes, sales taxes, and income taxes which they pay. From the national standpoint, it is the total expenditure that counts, but from the standpoint of the State or region, the amount spent within its borders is of paramount importance.

This fact is emphasized by the efforts made to attract the tourist trade. Since the tourist is by definition a nonresident of the place visited, it follows that the money which he spends there was earned somewhere else. His expenditures constitute a sort of export business for the State or community in which they are made. As one author (Morris E. Garnsey in "America's New Frontier, the Mountain West") has put it, "Expenditures in the region by tourists for food, lodging, transportation, licenses, and equipment are very significant in the regional economy. A net balance in this sector of the economy provides the region with large sums which can be used to purchase the manufactures and services which the inhabitants of the region buy abroad."

The All-Year Club of Southern California estimated in 1948 that in southern California tourist money was second only to aircraft manufacturing as a source of new money from out of the State. Californians, Inc., has estimated that in northern California tourist expenditures constitute the third largest source of basic income, being exceeded in value only by the income from manufacturing and agriculture.

As has already been pointed out, accurate estimates of tourist expenditures are not easy to make, but that they are both substantial and increasing cannot be doubted. Evidence of the significance attached to such expenditures in the communities where they are made is afforded by a recent survey by the Curtis Publishing Company. Out of 455 organizations questioned, 275 organizations reported that during the calendar year 1956 or the fiscal year 1956-1957 they are planning to spend \$15,784,390 in promotional efforts to attract tourists and vacationers. This figure contrasts with the \$3,603,075 they plan to spend to attract industry. Canada and Bermuda each plan to spend more than a million dollars to attract the American tourist.

Clearly tourism has a major economic impact on the industries and communities that serve it, as well as an ecological impact on the wildlands that it is using more and more intensively. Countries, regions, States, and communities within States compete for the favor of the tourist, although an occasional voice complains that the "foreigner" is changing the atmosphere of many a community for the worse and is ruining the hunting and fishing for the native.

### National-Income Method

Another suggested approach to the measurement of the economic significance of forest recreation is use of the national-income method. Roy A. Prewitt in a report on "The Economics of Public Recreation" made to the National Park Service in 1949 said:

My suggestion is that we forget about the "economic values" of recreation and think in terms of effect of recreation on national income... If recreation induces a certain expenditure which in turn generates national income, then it may be said that some indication of the benefit of recreation is how much of the national income is associated with the induced expenditure. Under this approach one would try to determine how much expenditure would be made for recreation on and off the area, and the income that this expenditure would induce in the economy.

A similar suggestion has recently been made by Marshall N. Palley in a dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Michigan State University. Palley proposes to apply the national-income methodology not only to the Nation but to individual States. He would determine the economic contribution of recreation to the income of the State by finding the sum of the incomes (including imputed incomes) accruing to wildland owners in a year through recreational use of the land, plus the income component of the expenditures for new construction and producers' durable goods contributing to the recreation industry,

plus the expenditures of government agencies for operations and investment in recreation improvements and facilities, plus that part of the income originating in the foods and eating, the lodging, the sports equipment, the transportation, and a few other miscellaneous industries in the State concerned which can be attributed to forest recreation. "Forest Recreation" he defines as a broad combination of wildland-oriented activities, including sightseeing, wilderness travel, winter sports, summer resorting, and summer camping and vacationing.

Prewitt felt that the national-income method "would not answer the question of alternatives, that is whether the economic welfare is enhanced more by expenditures on recreation than if they were made for something else." Palley is more optimistic on this score, as is evidenced by the title of his dissertation, "A Proposed Technique for Measuring and Comparing the Economic Importance of Timber and Wildland Recreation in Michigan." He would determine the economic contribution of timber to the income of the State by finding the end value of all rough and manufactured wood products originating in the forests of the State and before their shipment from the State, and adding to this amount the capital investments made by timber landowners (including public owners) and wood manufacturers.

The income method provides a broader base than the expenditures method for measuring economic impact, but the very fact that it requires the accumulation of more comprehensive and diversified data may make its practical application more difficult, particularly for individual States. There is also question as to whether the data on recreation and other activities would be sufficiently comparable, even from the economic standpoint, to afford any very reliable basis for deciding which activity should be favored from the point of view of community development and public policy.

## Input-Output Analysis

Much attention is now being paid by economists and planners to inter-regional analysis and regional development. An article by Walter Isard on "Regional Commodity Balances and Interregional Commodity Flows" in the American Economic Review for May 1953, illustrates for New England how the flow of commodities (which may include recreation) into and out of a region can be analyzed. The methodology of this approach depends largely on a consideration of input-output relations. It deserves thorough study as a possible means of throwing light on certain economic important aspects of the recreational use of forest lands.

## Benefit-Cost Analysis

The benefit-cost analysis is commonly used in determining the probable effects on recreation of proposed water developments such as reservoir construction. Various methods may be used for estimating benefits. A 1950 report of the Subcommittee on Benefits and Costs of the Federal Interagency River Basin Committee entitled "Proposed Practices of Economic Analysis of River Basin Projects" suggested "that the benefits of recreational use be derived or estimated values based on informed estimates of the average value

of these recreational facilities to prospective users." This approach is used by the National Park Service, which determines the annual benefit "by multiplying the estimated average annual recreation attendance at proposed water-control developments by a computed market value for recreation." This market value is placed at \$1.60 per visitor day, which in turn is based on prices commonly charged for the types of recreation involved. The monetary estimate is supplemented by a statement indicating in qualitative terms the conservation and recreational values that would be destroyed or added by the project.

Benefits (or losses) resulting from a project are estimated by the Fish and Wildlife Service by determining the difference between "with-the-project" and "without-the-project" values. Commercial fish and fur harvests generally are evaluated on the basis of market prices at the point where the products are first sold in the market. Monetary values assigned to sport fish and game harvest are based on sportsmen expenditure, assuming that the value to the sportsman is twice as much as his expenditure. These figures are then converted into a generalized value for each pound of fish or unit of game harvested, and this value is multiplied by the anticipated harvest for the specific project under consideration in order to compute the total estimated benefit. Migratory waterfowl are evaluated on a different basis by assuming an annual national harvest of 20 percent and assigning a prorated share of the cost of harvesting each duck or goose to each day an area is used by waterfowl. The Fish and Wildlife Service recognizes the impossibility of expressing the full value of wildlife as a recreational resource in monetary terms. It consequently provides for emphasizing the intangible values of wildlife in its reports on specific projects. In cases where intangible values are of outstanding importance, the monetary approach may be abandoned entirely.

Where the Forest Service has become involved in problems of this kind, it has tended to steer clear of benefit-cost analyses. For example, in determining the minimum flow that should be permitted from a proposed reservoir, it has emphasized the importance of fishing and scenery in qualitative terms without attempting to compare their monetary value with the monetary value of the water for irrigation or power. It has similarly decided whether a potential campground should be developed, and if so with what facilities, on other grounds than the monetary relation between expected benefits and costs.

### **"Marginal" Analysis**

Another approach to the comparison of relative values, sometimes referred to as the "marginal method," is discussed at length in a recent thesis submitted by William A. Atkinson in partial fulfillment of the requirements for the degree of Master of Science at the University of California under the title "A Proposed Method for the Recreational Evaluation of Forest Land." The method involves the calculation of a ratio between the value of an area for timber and timber production and its recreational use in man-days per year. This ratio expresses the value of the timber whose use is "foregone" if the area is devoted to recreational use in terms of its worth per man-day of recreational use. By calculating ratios for a considerable number of areas which are now devoted to recreational use (such as State parks) and to timber

production, a ratio or a narrow range of ratios will be found which marks the "margin" between the areas best suited to the two purposes. If the ratio for a doubtful area whose relative values are in question is less than the marginal ratio, the indication is that the area is best suited for recreational use; if higher, for timber production.

Like other quantitative methods of measuring recreational values, this one has its weaknesses. Can it safely be assumed that the areas selected for comparison are now devoted to their best use, particularly in the case of those near the critical marginal ratio? Is intensity of use (whether measured in terms of man-days, total number of visitors, or total expenditures) a sound basis for judging the value of an area for all types of recreational use? Is timber value determined on the basis of present stumpage value or expectation value for sustained-yield management? Would it not be necessary to look ahead more than five years (the period suggested by the author) in estimating trends in timber values and recreational use; and if so could estimates of this sort be sufficiently precise to be significant for purposes of ratio calculation?

### Another Marginal Approach

Another marginal approach to the determination of recreational values, which is perhaps more truly "marginal" in the usual economic sense, has been suggested by the Wild Land Use Committee of the Michigan Lower Peninsula Forest Research Council. "One possibility," according to the committee, "lies in establishing an economic experiment, designed to measure the values of sport fishing--for example, trout fishing. By establishing and controlling the probability of catch in different stream areas, and forcing the fisherman to announce his preference order (through varying prices according to the opportunity of catching fish), it would be possible to improve our estimates of the value of this kind of recreation... The same sort of experiment might well be applied to other evaluation problems of a similar nature, such as the evaluation of State park areas, game-fish versus pan fish, etc." Having constructed a demand curve by this procedure, "the next step would be to construct a supply curve, which is simply a curve resting upon the cost of providing these opportunities. Where these two curves cross is the logical point of operation."

Experiments of this sort, if feasible, would provide a means of determining the market value of different kinds and qualities of recreational opportunities. A major difficulty would be that the areas included in the experiment would almost certainly be in competition with areas where no attempt is made to charge what the traffic will bear. Users would naturally tend to avail themselves of equally attractive opportunities in free or low-priced areas, even though they might be willing to pay much more in an unsubsidized market. Like other approaches dealing solely with economic factors, the method necessarily omits any consideration of social values, which are likely to influence strongly the decision as to the extent to which subsidization is justifiable.

## Studies of Methodology

The difficulties in the way of expressing the value of "recreation" as an activity in quantitative terms and in units of measurement that will permit comparison with other values does not mean that the economic approach should be abandoned. Even though the existence and the importance of intangible values ("re-creation") are fully recognized, it is inevitable that comparisons of tangible, economic values will be made by legislators, administrators, and the general public. It is, therefore, desirable that they be identified and measured as accurately as possible. The very difficulty of the problem means that it should receive more rather than less attention.

Research in the methodology of measuring the economic values and impacts of the recreational use of wildlands is urgently needed. Studies should be made of the strengths and weaknesses, the advantages and disadvantages, of the various methods that have been or may be proposed. They must take into consideration the objectives for which measurements of economic values and impacts are to be made, such as comparison of recreational values with other values; comparison of different kinds of recreational values with each other; the contribution of recreational activities to national, regional, and State income; and the influence of recreational uses of different kinds on the economic well-being of the communities from which recreationists come and to which they go. Research in methodology will involve the use of pilot studies which test out the applicability of the methods under investigation to specific problems of limited scope. More comprehensive studies should be undertaken after the comparative merits of the various methods for the attainment of different objectives have been determined.

## Recreation as a Producer of Values

It is sometimes argued that recreational use of wildlands normally has a lower priority than other uses because it produces no wood, forage, water, or other goods--that it is not a creator of wealth but a spender and distributor of wealth created by some other activity. This contention is based on two assumptions: (1) That the production of material wealth constitutes the best use of natural resources, and (2) that the increase in man's efficiency resulting from the recreational use of wildlands, if any, is not enough to offset the loss in production due to the withdrawal of lands from commercial utilization.

The first assumption does not necessarily imply that work (production) is necessarily more important than play (recreation). Ever since God "rested on the seventh day from all his work which he had made," the need for taking some time for rest has been universally recognized; and in recent years the taking has been in substantial and steadily increasing amounts. It does imply that when production and recreation conflict in the use of a specific area, production should automatically be given the priority. This point of view raises the problem of what people really want out of life, on which research is certainly possible and which will be discussed later.

The second assumption does not imply that people do not get personal satisfaction out of recreation; the expenditures that they make to obtain it is ample evidence that they do, or at least that they think they do. It does imply that this satisfaction and any other influences which recreation may have on the individual do not improve his efficiency sufficiently as compared with other forms of recreation not involving the use of wildlands to justify the withholding of such lands from the production of goods "needed" by a growing population and an expanding economy. Closely related to the question of the effect of recreational use of forest lands on man's efficiency as a producer is the question of its effect on his quality as a citizen. These are fields in which opinions differ widely and in which competent research is sorely needed.

## Personal and Social Returns

Those who rate highly the "intangible" values of "re-creation" believe that the personal and social returns are even greater than the economic returns. Their attitude is also based on two assumptions: (1) That personal development physically, mentally, morally, esthetically, and spiritually is more important than the amassing of material wealth beyond that necessary to maintain a reasonably comfortable standard of living; and (2) that wildland recreation is one of the most effective means of promoting such development. How generally people accept the first assumption as valid can be determined by public opinion surveys, which are discussed later.

Little reliable information is available concerning the validity of the second assumption. Just how much do different kinds of recreational experiences in the forest and other wildlands improve a person's physical condition, and how lasting is the effect? Do they better prepare us to participate in civil defense activities which may necessitate outdoor living under rigorous conditions for a considerable length of time? Do they increase our productivity as workers? How effective are they as prophylactic and therapeutic measures in assuring mental health under the strain of modern life? Do they increase our esthetic appreciation of the world around us? If "the groves were God's first temples," do they still provide spiritual uplift? Can we join the psalmist in saying, "I will lift up my eyes unto the hills, from whence cometh my strength"?

Basic information of this sort will help to provide answers to other questions of a very practical nature. Will recreational experiences in a forest environment improve our physical and mental health enough to reduce the steadily growing cost of medical services, hospitals, and mental institutions? Will they reduce juvenile and adult delinquency and crime to the point where we shall need a smaller police force, fewer detention homes and industrial schools, and fewer jails? Will they create an esthetic appreciation of nature that will do away with the litterbug and indirectly develop a more discriminating taste in literature and the arts? In short, will they help to make the individual a better developed human being and a more effective member of society--and by how much?

## Relation of Recreation to Human Behavior

Here, even more than in the economic field, research in methodology is an urgent immediate need. It will take a lot of study and experimenting to work out methods that will express "intangible" values even approximately in quantitative terms. The field is a virtually untouched and highly difficult one which will require cooperative effort on the part of sociologists, psychologists, anthropologists, doctors, psychiatrists, social workers, economists, political scientists, ministers, and others. It is also an extremely important field, since the interest that society should take, and the investment which it should make, in providing recreational opportunities depend largely on social returns that may be expected.

Research along the lines suggested may well be undertaken simultaneously by a number of institutions and agencies, but preferably under a co-ordinated program that will keep each agency in touch with the others. Such a program would in effect constitute research in the various aspects of the relation between forest recreation and human behavior. It would identify and analyze the motives which cause a person to be interested in different kinds of forest recreation; would determine how and why he acts as he does when engaged in recreational activities; and would measure the effects of the recreational experience on him as an individual and as a member of society. It would provide information of great theoretical and practical importance in handling a major human activity concerning which we now have little basic knowledge beyond that based on casual observation. The ideal way to undertake a truly comprehensive and unified program of this sort would be through adequate support by some foundation.

## Value Judgments and Public-Opinion Surveys

It is highly unlikely that we shall ever be able to express the diverse personal, social, and economic values of the recreational use of forest lands in terms that will permit a valid direct comparison with the values arising from other uses of those lands. This is equally true with respect to the relative values of different forms of recreation. Decisions as to what single or multiple land use should be favored in a particular situation, and as to how much should be spent to develop that use, must therefore be made more on the basis of judgment than of mathematics.

This fact is stressed in an article on "Diminishing Returns in Modern Life," by James Truslow Adams in Harper's Magazine for April 1930. He points out that as a result of modern roads a spot of unusual beauty on Long Island that formerly was frequented by only a few people is now visited on a weekend by as many thousand, with the usual accompaniment of lunch boxes, papers, bottles, tin cans, and other litter. "I admit," says Adams, "that according to the Declaration of Independence and the New Testament, there was no reason why only a privileged few should enjoy the solitude and beauty of the Point. Theoretically there is no reason why the whole million cars of New York State should not have been there instead of the half dozen of the earlier days. Theory, however, has nothing to do with it. The plain fact is that those eight thousand people... were not sharing what I had enjoyed before

... The point is that by the mere fact that eight thousand people tried to enjoy the solitude and beauty of Montauk at once, the solitude and beauty evaporated... What the many got was something entirely different from what the few had got. Which of these, for the whole human race for generations to come, might be the better would baffle the mathematics of even an Einstein to figure out."

Value judgments on the part of the community, guided but not controlled by mathematics, determine what public support will be given to schools, public libraries, art galleries, museums, and public health services. Such judgments must similarly be relied upon to make many decisions in the field of forest recreation. It is, however, essential that the judgment be an informed one guided by the best information obtainable concerning all of the factors having a bearing on the situation. Research not only along the lines discussed in this report but also in other aspects of forest land management and wood utilization is indispensable in providing such information. For example, to what extent may more intensive timber management and the substitution of other materials for wood obviate the need to use high-quality recreation land for timber production?

Decisions concerning uses and expenditures are made in the first instance by legislators and administrators, often under the influence of pressure groups. These decisions should be currently influenced by, and in the long run will be largely controlled by, the wishes of the people. Democracy often acts slowly and hesitantly, but the electoral process gives it the indirect power to obtain eventually what it wants. The last word, which is likely to be a compromise between conflicting interests, will be spoken by the community, from town to Nation, on the basis of its judgment as to the relative importance of the various tangible and intangible values involved.

This does not mean that the people will necessarily support only the forms of forest recreation which they themselves favor or in which they expect to participate. Schools of higher education are readily supported as a desirable social institution by taxpayers most of whom do not expect to derive any personal benefit from them. Similarly, wilderness areas which may be used by only a small minority may be regarded by the majority as worthy of preservation in a world where escape from the "madding crowd" is becoming both more difficult and more necessary if the unique values which they provide, and which Americans have always treasured, are not to be lost forever.

These facts make it important to determine people's views and desires through public-opinion surveys. Many difficulties are involved in such surveys, but recent developments in the techniques of sampling and interviewing have greatly increased their dependability, as is shown by experience in other fields. Two major objectives would be sought: (1) To determine people's views with reference to the relative importance of recreation as forest use, and to the wisdom of withdrawing large (how large?) areas such as parks, recreation areas, and wilderness areas from commercial utilization; and (2) to determine the kinds of recreational use of wildlands, if any, in which they themselves are particularly interested, and the kind of facilities that they desire. In obtaining the first type of information it would of course

be necessary to make sure that the person being interviewed already had some understanding, or was made aware, of the relative values of recreation and other forms of forest use and of the effect of different policies on the realization of those values. For example, he should know that there will be no mechanized transportation and no commercial utilization of timber in a wilderness area, while on the other hand he should realize that if such transportation and utilization were allowed the unique features of a wilderness area would be irrevocably destroyed. In connection with the second type of information, it is important to know to what extent an individual's views are based on his own past experience.

Public-opinion surveys adequately conducted and analyzed will throw a great deal of light on a large number of related questions of major importance. What differences in views exist among people in different parts of the country, in urban and rural communities, in different age classes, in different occupations, and in different income groups? In what parts of the country, and how far from home, do they prefer to obtain their recreation? Why do they prefer certain types of recreation, and what benefits do they believe they obtain from them?

Opinion surveys can be conducted either by the administrative agencies in charge of recreational areas or by an outside agency that specializes in the field. Both methods should be used. The administrative agency has the advantage of being able to make contact with recreationists on the ground through representatives thoroughly familiar with local situations, and probably at smaller cost; while the specialized agency has the advantage of objectivity, experience, and the ability to use trained interviewers. National, regional, State, and even more limited surveys will be needed.

## MANAGEMENT AND ADMINISTRATION

### Multiple Use

Management of land for recreational purposes cannot be completely divorced from its management for other purposes. It is an integral part of multiple land use, the objective of which is to use each part of an administrative unit for the purpose or purposes to which it is best suited, with a view to assuring the most effective use of the area as a whole. To attain this objective requires determination of the extent to which different uses are compatible or incompatible. In any large administrative unit such as a national forest or a national park, practically all of the uses appropriate to that particular type of unit are possible without serious conflict. But as the area is reduced to a ranger district, a watershed, a forty, or a single acre, the number of compatible uses becomes smaller.

The problem is to determine for specific areas what uses are compatible, partially compatible, and incompatible. When incompatibility exists, a choice must be made between conflicting uses. When partial compatibility exists, a decision must be made as to which use will be given priority, and as to what kind of management will give optimum results from the standpoint both of the major and the minor uses.

Questions such as these call for research which will provide the information necessary to enable the administrator to make sound judgments respecting the practical application of the principle of multiple use, and to enable the technician to practice the kind of management necessary to attain the desired objective. The decision of the administrator involves a weighing of relative values (economic and social) in which he will be guided largely by the facts and opinions made available to him by the studies suggested in the section dealing with "Costs, Returns, and Values." The technicians will be guided in the managerial practices which he adopts by the results of research dealing with biological and physical factors.

## Basic Relationships

Basic studies of the relationship between soil, water, plants, and animals are of fundamental importance in the handling of recreational activities as in all other aspects of land management. They provide grist for the technician's mill in all branches of forest management and should consequently be strengthened as rapidly as possible. It is of course essential that the results of such studies be applied with due regard to the special requirements of recreational areas. In addition there is need for some research dealing more specifically with management for recreational purposes.

## Control of Fire

Two aspects of fire control that deserve much more study than they have so far received are the recreational use of forest lands as a cause of forest fires, and the effect of fires on recreational values.

Practically no fires start from properly developed picnic areas and campgrounds. On the other hand, many fires are started by campers while on hunting, fishing, hiking, and overnight camping trips; and also by persons engaged in these activities who make no use of campground facilities. Research is needed to identify the risks peculiar to each type of recreational activity and to develop methods for reducing the hazard, including more effective educational programs. The use of fire-retardant chemicals to prevent both the start and the spread of forest fires offers a promising but little studied approach to increasing the effectiveness of fire control both in general and in areas of special value for recreational purposes.

The immediate effect of forest fires on recreational values is always adverse--usually more so than on timber values, where some salvage is often possible. This fact justifies research that will lead both to a clearer understanding of different recreational values and to more effective measures for their protection. On the other hand, there may be areas of tangled dead timber resulting from blowdowns, insect attacks, or previous burns where controlled burning might result in a better environment for wildlife or might initiate a vegetative succession more favorable to recreational uses.

Research is needed to identify areas of potential value for recreational use where the fire hazard is high, such as canyon bottoms, with a view to regulating recreational occupancy so as to reduce the otherwise excessive

danger of loss of life and property. Wilderness and other roadless areas offer several special problems relating to fire-control policy, methods, and costs. Research is urgently needed both to guide policy decisions along sound lines and to implement effectively whatever policy may be adopted.

## Control of Insects and Diseases

Further study is needed to make possible the identification of trees particularly susceptible to attack by insects or disease. While this ability is desirable in all forest management, it is especially so in the handling of recreational areas whose attractiveness is greatly enhanced by the forest cover. Early recognition and prompt removal of trees that are likely to become foci of infestation or infection is therefore important.

More information is also needed as to the origin of insect and disease epidemics. We must be able to recognize incipient outbreaks, and to know when and how control measures need to be undertaken to prevent their spread from areas where control measures are not usually undertaken, such as wilderness areas, to adjacent stands of timber. Other problems in the field of entomological research include the control of insects attacking trees which are of little commercial importance but which may have high recreational value, such as pinyon pine and white-bark pine, and the biological control of insects by the use of parasites and predators so as to avoid the necessity of cutting or spraying.

## Timber Management

In the silvicultural field, research is needed to determine how to handle cutting operations on or near recreational areas so as to cause minimum damage to recreational values. The instructions to regional foresters on this subject now in preparation by the Forest Service are excellent so far as objectives and general principles are concerned, but they do not and cannot go into detail as to the cutting practices that should be followed in individual stands. Yet the success of combining timber management and recreation management as compatible aspects of multiple-use forest management depends on the skill with which the cutting is done. Obviously the simultaneous attainment of two objectives is more difficult and requires more technical knowledge and better judgment than the attainment of either objective alone.

Among the things that we need to know are how to retain, reproduce, and establish the kinds of trees and stands that are preferred for different sorts of recreational use; how to use silviculture as a tool to reduce damage by fire, insects, and disease in areas intensively used for recreational purposes; and how to conduct logging operations, including slash disposal, with the least practicable injury to recreational values. In general terms, the objective is to find ways and means of making timber management an asset, or at least not a serious detriment, from the point of view of the various kinds of recreational activity that do not require complete abstention from timber utilization.

## Wildlife and Range Management

Since hunting and fishing are a major recreational activity from the standpoint of the number of participants and total expenditures, as well as in other respects, intensified research in the field of wildlife management is important. One problem that deserves special attention is control of the abundance of wildlife in national and State parks where neither cutting nor public hunting is allowed. More information is needed on silvicultural methods which will promote the production of both timber and wildlife and thus avoid the creation of "biological deserts." One aspect of this problem is determination of the effectiveness of prescribed burning in different types and sites on wildlife management and timber management with due consideration of the relative values involved.

How to produce big game and domestic livestock satisfactorily on the same range is a perennial problem that deserves further study. The impact of sheep and cattle grazing on recreational values is another thorny problem. While most people may enjoy the sight of livestock at a reasonable distance, for sanitary and other reasons they do not like to share picnic areas and campgrounds with them.

## Control of Avalanches

Further study of the control of avalanches in winter sports areas is much needed. This should go beyond experiments in the use of tree planting and dynamiting as control measures to underlying causes. Basic research should be undertaken to identify the character of the snowfall that takes place and of the snow sheet that forms under different atmospheric conditions. It should be accompanied by research to determine what combinations of precipitation, snow blanket, weather conditions, and topography create conditions favorable for the occurrence of avalanches, and how the danger created by such conditions can be avoided or reduced.

## Carrying Capacity

A basic problem in recreation management, comparable to that of sustained yield in timber management, is determination of the "carrying capacity" of different sites for different recreational uses. How much use can a given area stand without physical deterioration of the site and without impairment of esthetic and spiritual values?

There has been much discussion of the effect of recreational use on the site, but with the exception of the studies by Dr. E. P. Meinecke in California there has been little research on the subject. We need much more information as to the effect of different kinds and concentrations of use with respect to different species of trees and shrubs, age classes, stand densities, soil, topography, and precipitation. So many combinations of these factors occur as to make any generalization clearly impossible. For each combination we need to know to what extent soil compaction and destruction of ground cover take place, what are the indicators of damage, and what influence these

changes in the environment have on erosion, runoff, stream pollution, and the thrift of the overhead cover.

We need also to know the carrying capacity of different kinds of land for different kinds and concentrations of recreational use in terms of the "recreation" enjoyed by the user. How heavily can a campground, a fishing stream, or a wilderness area be used without destroying the very values which the recreationist seeks?

The problem of carrying capacity can be approached in two ways--by studying the effects of past recreational use and by the establishment of experimental areas. Experimental areas for the study of timber management and range management under carefully controlled conditions have demonstrated their value. There would seem to be no reason why similar experimental areas for the study of recreation management should not prove equally valuable. Studies of areas with different site conditions and different intensities of recreational use have the disadvantage that detailed and accurate information as to such conditions and use in previous years is not available; but they have the advantage of providing some facts immediately and of suggesting some of the problems that should receive special attention at the experimental areas. The two lines of investigation should supplement each other effectively.

When one knows that the carrying capacity of the Convict Lake campground in the Inyo National Forest, of the Manitou Park campground in the Pike National Forest, of the floor of the Yosemite Valley, or of the High Uinta Wilderness Area has been exceeded, how does one go about remedying the situation? Reducing the use, or rotating the use, of areas to which people have become attached and persuading them to accept new (and perhaps less desirable) areas, even if funds for the development of the latter are available, is no easy task. Adjusting use to carrying capacity will involve the solution of difficult problems in the management of people as well as of natural resources.

### Allocation of Managerial Responsibility

Who should do what, where, and when constitutes a major problem in the administration of natural resources, in which recreation plays an important part. What are the relative responsibilities of the Federal government, the States, other public agencies, and private owners? On this point, the "Recommended General Policy of the Federal Government Relative to Public Recreation" adopted by the Federal Interagency Committee on Recreation on November 5, 1951, has this to say:

It is the responsibility of communities to provide recreation areas, facilities and services to the people within their political boundaries through private and public agencies. The State governments have the responsibility to assist the communities by enacting adequate enabling laws, by providing advisory and information services and by providing such complementary recreation areas, facilities and services throughout the State as may be needed. It is the responsibility of the Federal Government to

develop, and to arrange for others to develop, the recreation resources on the Federally owned lands, and to complement State and local programs in full cooperation with the States and their political subdivisions, without assuming responsibilities that properly rest with the States and their political subdivisions.

The basic principle that initial responsibility rests with the local communities and that a program to meet the recreational needs of the people of the entire Nation should be built from the bottom up may be sound in theory, but it has not always been followed in practice, so far at least as forest lands are concerned. Here leadership was taken first by the Federal government and then by the States. Doubtless this was inevitable since in many wildland areas there were no local communities, and in others the local communities had neither the need nor the funds to develop recreational facilities. Only as population pressures have developed have governments at any level felt any clear-cut responsibility for giving recreation a prominent place in their land-management activities.

The land disposal and acquisition policies of the Federal and State governments, and a changing emphasis on the relative importance of different natural resources, have produced a somewhat haphazard pattern of land ownership and policies which is still in process of evolution. It is high time to study the results that have been achieved by the many agencies involved as the first step in obtaining coordinated and effective development of recreational activities as part of an integrated program of land management.

Such an undertaking will necessarily have to start with the status quo. It will also have to deal both with general principles and with specific cases. For example, if unified management of an administrative unit such as a national forest is accepted as a sound basic principle, are there sometimes circumstances under which transfer of administration over part of the unit to another agency, such as a State or county park service, under special use permit, seems desirable with due consideration of all the values involved? If so, what are they? The proposed recreational inventories, studies of economic and social values, and public-opinion surveys will be of much value in answering questions of this sort.

The national and State-by-State studies of forest-land ownership suggested by the American Forestry Association, if actually carried out, will be helpful in throwing light on present ownership patterns, policies, and results. They will not, however, be any substitute for careful studies by public agencies and by private owners of their own situation, and for cooperation among these groups in conducting studies to determine what allocation of administrative responsibilities is likely to be most effective in promoting the public interest. A review of the problems involved by an impartial and competent outside agency or institution might also be helpful in guiding legislative and administrative action along sound lines.

## Layout and Equipment of Recreational Areas

An important field for research deals with the layout of recreational areas from the standpoint of usability, attractiveness, and ease of administration. Are small or large campgrounds preferable? What variations in the distance between tent (or trailer) sites is desirable from the points of view of privacy and sociability? Should screening of individual sites be permitted, or should there be adequate "buffer zones" in the form of distance or vegetation to make this unnecessary? What herbs, shrubs, and trees should be used in such zones and in other landscaping? What barriers provide the best combination of effectiveness and attractiveness?

Are present standards for tables, fireplaces, water, toilets, and garbage disposal satisfactory? Are enough campgrounds being equipped with flush toilets, showers, and laundry facilities to meet the needs of today's and tomorrow's visitors? How are the requirements of the rapidly increasing number of trailers to be met? What provision must be made to safeguard the health and comfort of the users of increasingly congested campgrounds in wilderness areas? Under what conditions, if any, can "urban" recreational facilities such as swings, slides, and teeters to provide amusement for the children and ball diamonds, tennis courts, horseshoe courts, and shuffle boards for the older folks be installed without destroying the "natural" atmosphere characteristic of forest lands?

Intelligent answers to questions\* such as these will require much study. The combined efforts of foresters, engineers, landscape architects, and architects will be needed in obtaining and applying the information necessary for the rehabilitation of existing areas and the development of new areas. It is particularly important that new areas should be carefully planned and adequately equipped from the very start. Unless this is done it will not take long for them to deteriorate into slums and the job of catching up will never be completed. Rehabilitation of run-down areas is of course essential, especially so far as sanitary conditions are concerned, but the results of a few years' delay will be less serious than permitting new areas to degenerate into "slums."

## Educational Program

A supplementary activity that would materially increase the service rendered by recreational areas, particularly at campgrounds, is an educational program. Such a program could add much to the pleasure and knowledge of visitors by showing them how to adjust themselves to forest conditions, with resultant increase in comfort and safety; by acquainting them with the plant and animal life of the forest and their relation to each other and to their environment; and by informing them on some of the major objectives, principles, and practices of multiple-use land management, with special reference to the activities of the Forest Service and the administration of national forests. The service might be offered on a full-time basis during the summer by men employed for the purpose, or on a part-time basis by forest rangers and recreation guards. Considerable preliminary study would be needed of the content of such a program and of ways and means of making it most effective.

## Charges for Recreational Use

A major problem of policy and administration that has not yet received the attention it deserves is whether a charge should be made for the use of recreational areas and facilities, and if so on what basis. The issue is one on which opinion is strongly divided. Practice among other agencies varies widely, with an increasing tendency toward making at least nominal charges, particularly on the part of the States. In New Hampshire the entire State Park Department, including overhead administration, is financed by charges made for the use of parks, with no State appropriation.

The main arguments in favor of charges are that they may be used to help finance the development and operation of recreational facilities, that those who actually use the areas should as a matter of equity pay at least part of the cost of administering them, and that people appreciate more and take better care of things that cost them something.

Problems are involved in determining the particular use or uses for which a charge should be made, the amount of the charge, the method of collection, and whether the charge is made by the administrative agency having jurisdiction over the area or by a concessionnaire. Charges are most commonly made for the use of special facilities such as those found at campgrounds, with the amount of the charge depending on the character and cost of the facilities; but they may also take the form of an entrance fee or a parking fee. The collection of fees involves a difficult administrative problem when the amount of use is not sufficient to justify a full-time custodian. This would happen less frequently than is now the case if the educational program previously suggested were put into effect. Consideration should also be given to collection of fees by the use of mechanical devices such as meters, or by adaptation of the "honor system" under which newspapers are sometimes sold. Wherever charges are regarded as desirable as a matter of policy, necessity should be the mother of invention in finding some way to collect them.

## Workload Analyses

A final suggestion is that study of present Forest Service procedures for formulating requests for appropriations for maintenance, improvement, rehabilitation, and extension of recreational areas is in order. Detailed reports on Volume of Business by ranger districts are now submitted at five-year intervals for the field of recreation. More frequent reports would seem essential to keep abreast of an activity that is expanding as rapidly as is recreational use of the national forests. Under present procedures, figures on the volume of recreational business are apt to be out of date in a year or two, and consequently to result in an underestimate of the workload.

It is also questionable whether the present "Correlated Standards and Converting Factors for Determination of Index Job Load Weights" will continue to be applicable as facilities improve in quantity and quality, particularly if even a modest educational program is inaugurated. Both factors raise doubt as to the continuing reliability of current workload analyses and the resulting estimates of needed funds.

## CONCLUSION

Recreational use of forest and related lands has grown rapidly in recent years, with every prospect that it will increase still more rapidly in the future. The situation is one of serious concern to both public and private agencies. While vigorous administrative action in the rehabilitation, development, and expansion of recreational areas and facilities is urgently needed, there is also need for a comprehensive program of research that will guide such action along sound lines. Major problems in need of study may be grouped under the three main headings of supply and demand; costs, returns, and values; and management and administration. Many of them will require cooperative effort, and interested agencies (Federal, State, local, institutional, and private) should participate in the formulation of the research program.

The following problems, listed in approximate order of priority, appear to be of particular interest to the Forest Service at this time:

1. a. Completion of inventory of present and potential sites and facilities for different kinds of recreational use on national forests.  
b. Estimate of present and potential demand for different kinds of recreational opportunities and facilities on national forests by study of all relevant factors that may influence the demand, and by determining the preferences of present and prospective users. Both "a" and "b" will require the development of technologies that are reasonably accurate and economical for the purpose.
2. Cooperation with other agencies in initiating and conducting a nationwide review of the present and potential supply of, and demand for, different kinds of recreational opportunities and facilities on all types of forest ownership. Such a review will naturally raise questions as to the relative responsibilities of the various public and private agencies engaged in the management and administration of recreational resources--a subject deserving of thorough cooperative study. The comprehensive national review might well be preceded by pilot studies in one or more regions or States, and should be followed by continuing surveys to keep the initial survey up to date.
3. Cooperation with other agencies in organizing opinion surveys to determine public attitudes with reference to general recreation policies and to the kinds of recreational opportunities desired. Such surveys, to be most useful, would have to be made at the national, State, and possibly more local levels. They would furnish a valuable extension of such information as may be collected by the Forest Service and other agencies concerning the attitudes and wishes of users of properties under their respective jurisdictions.
4. Determination of the carrying capacity ("sustained yield") of land for various kinds and concentrations of recreational use under different conditions of soil, topography, precipitation, vegetative cover, age classes, and stand densities. The impact of recreational

use must be measured in terms of its effect on physical, biological, esthetic, and inspirational features of the area under consideration. Studies should be made both of areas that have previously been subjected to various kinds and concentrations of recreational use and of new areas made available for recreational use under controlled conditions.

5. Research dealing with the recreational use of forest lands as a cause of forest fires, and with the effect of fires on recreational values.
6. Research to determine the compatibility of timber utilization and recreational uses of different kinds in national forests, and to develop the most effective method of coordinating the two uses. Such research must take into consideration both silvicultural factors and the reaction of the recreationist to timber cutting.
7. Research dealing with the early identification of trees particularly susceptible to attack by insects and diseases; with the factors responsible for the outbreak of epidemics; with the control of insects and diseases attacking species of small commercial but large recreational value; and with the biological control of insects by the use of parasites and predators.
8. Research to improve wildlife management for recreational purposes as an integral part of multiple land use. Specific problems include the determination of methods of timber management that will avoid the creation of "biological deserts," and of range management that will harmonize use of the same range by big game and domestic livestock. Other problems in the field of range management include the encroachment of livestock on recreational areas; their influence on sanitation and health; and the reaction of the recreationist to their presence.
9. Additional research relating to the control of avalanches in winter sports areas. Special attention should be paid to basic research dealing with the combinations of precipitation, snow blanket, weather, and topography that result in avalanches.
10. Studies of the location, layout, design, and equipment of recreational areas of different kinds. Such studies should include determination of the species, sizes, and distribution of trees, shrubs, and herbs that should be used both in the layout of new areas and the rehabilitation of wornout areas. Studies of the most effective designs and materials to use in the construction of recreational facilities such as tables, grates, toilets, garbage containers, barriers, and water supply and sewage disposal systems are important. Chemical, bacteriological, and engineering research aimed at facilitating the disposal of sewage and garbage should be considered in this connection.
11. Study of the entire problem of charging for the use of various kinds of recreational areas and facilities on national forests, with due

regard to both theoretical and practical considerations. Specific items include the basis for and amount of charges for different kinds of services and facilities, methods of collection, and public reaction. The study should consider the experience of other agencies.

12. Study of the desirability of combining an educational program with recreational use of the national forests, and of ways and means by which this might be done. Problems of policy, methodology, and administration are involved, in which the experience of other agencies would be helpful.
13. Establishment of experimental recreational areas, similar to experimental forests and experimental ranges, for the intensive study of such problems as the impact of recreational uses of various kinds and intensities; the correlation of recreation management with timber, range, and watershed management; the layout of recreational areas; and the design, construction, and maintenance of recreational facilities. Some of the larger experimental forests already in existence might lend themselves well to research of this sort, particularly in the study of problems of multiple use.
14. Re-examination of present procedures for determining workloads and appropriation estimates in the field of recreation. The study should include such matters as the needed frequency of volume-of-business reports on recreational activities; whether present work standards are adequate in view of the heavier burden of maintenance imposed by the steadily increasing quantity and quality of facilities being installed at improved areas; and whether estimated costs for rehabilitation and expansion pay sufficient attention to the prospective public demand for more and better facilities.
15. Research into the strengths and weaknesses, the advantages and disadvantages, of the many methods that have been suggested for measuring the economic values and impacts associated with the recreational use of forest lands. This foundational study of methodology should be followed by application of the more promising methods to the investigation of specific problems. Progress would be facilitated by cooperation with other agencies, notably research organizations and educational institutions.
16. Research into the strengths and weaknesses, the advantages and disadvantages, of the possible methods for identifying, and so far as practicable of measuring, the "intangible" personal and social values which constitute the "re-creation" resulting from the recreational use of forest lands. Practical application of the more promising methods would follow the foundational study. So many disciplines are involved in this field of research that cooperation among a wide variety of agencies is almost essential for its effective prosecution.
17. Basic and comprehensive research into the relation between the recreational use of forest lands and human behavior. Such a study

would attempt to determine the underlying motives that influence a person in desiring a certain kind of recreation; the reasons why he behaves as he does while engaged in a recreational activity; the influence of different kinds of recreational experiences on an individual's physical, mental, moral, esthetic, and spiritual condition and reactions; and their effect on him as producer, consumer, and citizen in the society in which he lives. It is obviously closely connected with the subject suggested in the preceding paragraph.

All of the items in the above list are of major importance in the development of a comprehensive program of research in the field of forest recreation. They will be supplemented by current research in the fields of forest protection, timber management, range management, watershed management, and wildlife management which are already receiving much, although still inadequate, attention in the investigative programs of the Forest Service and the Fish and Wildlife Service. A large part of this research deals more or less directly with problems in the field of forest recreation, and it is essential that the findings be used in their solution. Multiple land use calls for taking full advantage of all available information concerning the resources involved in bringing about integrated land management.

Some of the items toward the latter part of the list should and undoubtedly will receive early attention. This is partly because such action is necessary to achieve a well-rounded program, and partly because some of the earlier items are too complex and too expensive to permit undertaking them all simultaneously.

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